among the most technically competent in the field. I look forward to using the book regularly, but not intensively, and I strongly recommend the *Commentary* and the *Definition* to those interested in ML who know that such books are not intended for teaching ML nor to increase actual programming skills.

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G. Huet and G. Plotkin, eds., *Logical Frameworks* (Cambridge University Press, Cambridge, England, 1991), Price £30.00, $65.00 (hardcover), ISBN 0-521-41300-1.

The concept of logical framework applies to formal frames for building various deductive systems. Considering the implementation requirement, it obtains also features of computational environments (of workbenches) for logic. Both aspects are considered in the present book. In building verification systems for software and hardware as well as formal program construction systems one can benefit from logical frameworks as tools. This could be a practical justification of the interest in logical frameworks. However, there is a deeper motivation of research in this field—investigating the computational content of logic. Realizability of logical formulas, observed by Kolmogorov and Heyting in the thirties, was presented by Curry and Howard in the form of a "propositions-as-types" interpretation and developed by Martin Löf in his intuitionistic theory of types. The latter possesses the generality of a framework for implementing various logical theories, but is too hard to "computerize" directly in its full generality. Starting from the first Automath framework developed by de Bruijn more than twenty years ago, the work on logical frameworks began. However, the implementation part of it has remained mostly experimental, whereas interesting results have been obtained in deeper understanding of deductive systems, type theories and their relation to computations. It has become clear that very fundamental ideas of program development originate from here. In a somewhat vulgar way one cay say that Lisp and Prolog (i.e., functional and logic programming of today) arc only shallow reflections of this basic research in computational logic which is the content of the book.

This is a collection of carefully selected papers produced as a result of the First Annual Workshop on Logical Frameworks. The papers are grouped into the following six chapters:

- Frameworks,
- Implementations,
- Representing Formal Systems,
- Type Theory,
- Proofs and Computations,
- Logical Issues.

These chapters are more closely related to each other than their titles show. The keywords throughout the book are: typed lambda calculus, simple types, dependent types. This also shows where the frontier of the research lies today: it is in the implementation of calculi with dependent types with some restrictions imposed by the requirement of practical realizability. It is interesting to observe how various points of view on logical frameworks expressed in different papers still converge when implementation is concerned. The philosophy of the paper by P. Aczel, D. Carlisle and N. Mendler is: treating the notions of propositions and truth as fundamental. In other papers, the starting point is in type theories which are thereafter used to describe logical notions. In both cases the implementation part is quite similar, exploiting a kind of typed lambda calculus. Generalized resolution techniques with higher-order unification are used for proof construction.

The book gives an up-to-date picture of the research in logical frameworks by presenting a collection of papers from the best researchers. To read it, one has to be familiar with basic ideas of logics and lambda calculus. A number of papers are almost self-contained and give a good introduction to the subject (e.g. the paper by P. Aczel, D. Carlisle, N. Mendler and another by F. Pfenning). The other papers are also written in a clear style and carefully edited.

It is not a rule that proceedings of a workshop are of very high quality. These proceedings are. Apparently, being the first collection of papers in a field is one of the reasons of the really high quality and richness of its content. Also, the editors and authors of the book are known by excellence of their writing. I intend to keep this book, expecting that in coming years it will remain a valuable book of reference. Graduate students and researchers in computer science should find the book useful as an up-to-date survey of works in computerization of logic.

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John Launchbury, *Projections Factorisation in Partial Evaluation* (Cambridge University Press, Cambridge, England, 1991), Price £22.95, $39.95 (hardcover), ISBN 0-521-41497-0.

According to the definition partial evaluation is an optimization of a program in the context when incomplete or partial information about program arguments is given in advance. The book concentrates on a particular subtask of the problem, namely to find a way of formal reasoning about what is partial information. In earlier works on partial evaluation the only way to present incomplete information